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EDITORIAL

Data for social LCA

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It is not easy to define the fast-evolving *social life cycle assessment* (LCA) field. Four years after the publication of the social LCA guidelines by UNEP, the area of research is still defining itself. Perhaps, as Jørgensen (2012) puts it, social LCA is still striving to attain maturity. This might be caused by (1) confusion on the goal and scope of social LCA and (2) a lack of data and practical tools to experience the full breadth of what social LCA seeks to offer. This is changing though, as data and tools are becoming available and will shape again the technique in new ways.

1 Goal and scope of social LCA

Guinée et al. (2011) recognizes the increasing multidimensionality of life cycle assessment. Indeed, LCA, as a technique, is now used to study not only the impacts of product life cycles but also those that can be assigned to baskets of goods, companies, households, countries, and the planet. Impacts being considered in LCA are also more diversified and include social issues, biodiversity, land-use changes, waste, and others. An imperative to study not only the negative impacts but also the positive influence which one (individual or company) might exercise on impact reduction and increasing benefits has also risen (Norris 2013). In addition, many LCA practitioners have also experienced the need to implement a company-based environmental management approach in order to follow up on actions prioritized via LCAs and report on their progress and effects.

The definition of social LCA (S-LCA) recently provided by Jørgensen (2012) and very much in line with the one offered earlier in the S-LCA guidelines (2009) understands S-LCA as a methodology for providing decision support about the social impacts related to product life cycles. It presents S-LCA as more holistic than comparable tools in the social assessment sphere because of its inclusion of the entire life cycle and frames its use as a decision support tool for comparing products or identifying hotspots. However, together with many colleagues, I do not see product comparison as a promising outlet for social LCA because of the sensitivity of the issues at stake and the uncertainty inherent to the analysis.

However, the other goals listed above, which represent also the ones typically assigned to LCAs, can be broken down into a much larger set depending on the context and the issues to be included. The diversity of goals and scopes thus creates incentives for the development of different methodologies and might be the underlying reason behind the multiplicity of approaches to social LCA.

Table 1 presents some of the key parameters of a social LCA study. In addition to these choices, some other objectives and factors will influence what type of approach is elected or developed. For example, is the goal to provide a combined environmental and social LCA, a *life cycle sustainability assessment* or a stand-alone social LCA? Is it anticipated to carry out a generic, desktop-type study only, or is it planned to conduct site-specific assessments? Is it foreseen to use both types of data collection within the study?

Among the list of key choices, we also find the choice of analysis level. Do we plan to study a company, a company division, a group of products, a single product, or a technology? Is the main object of study at the level of retail, major supplier, supplier, or industry association?

As we clarify and improve our understanding on S-LCA's goal and scope, and goal and scope variation, we will be better able to identify and explain commonalities and differences within the S-LCA landscape and, perhaps, to better describe what is necessary for a social assessment to become a social life cycle assessment.

Study goals might also evolve within a study. If we take the example of consumer goods, early in the process, there is a need for companies to understand the extent of their product system potential impacts and to start prioritizing action such as

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Table 1 Key parameters of a social LCA study design

Goals	Social issues	Context of application	Life cycle stages
Understand	Single impact category	Product design Suppliers program	One life cycle stage
	Multiple impact categories across multiple stakeholder groups	Establishment of purchasing procedures or specifications	All life cycle Supply chain
	Categories related to one stakeholder group	Prioritize site-specific assessment Strategic planning	Value chain
	Other		Cradle to gate
Weigh	Single impact category	Development of public/company policy	One life cycle stage
	Multiple impact categories across multiple stakeholder groups	Development of corrective action plans and social responsibility programs	All life cycle Supply chain
	Categories related to one stakeholder group	Product comparison/alternative	Value chain
	Other	Scenarios	Cradle to gate
Educate	Single impact category	Educate stakeholders on social impacts of production	One life cycle stage All life cycle
	Multiple impact categories across multiple stakeholder groups		Supply chain
	Categories related to one stakeholder group		Value chain
	Other		Cradle to gate
Communicate	Single impact category	Reporting and labeling Communicate with suppliers/customers	One life cycle stage
	Multiple impact categories across multiple stakeholder groups		All life cycle Supply chain
	Categories related to one stakeholder group		Value chain
	Other		Cradle to gate

further data collection—this requires a specific set of tools. Once this exercise is completed, the company has a plan of the data it would like to obtain from suppliers. The data is then collected from suppliers (and that requires a specific process). This step allows the company to replace generic risk values with more precise results and perhaps also to add positive impacts.

The company may now wish to prioritize further action and assess (1) root causes, (2) improvement opportunities, and implement (3) collaboration and stakeholder engagement. In that context, a consequential assessment that would enable assessing and weighing the cost and benefits of implementing a solution would be very relevant.

Finally, a company might want to report on the success or challenges of its social responsibility program. *Life cycle attribute assessment*, a methodology introduced by Norris (2006) and presented as a core component of social LCA in the UNEP-SETAC social LCA guidelines (UNEP-SETAC et al. 2009) provides a way to measure and report about the scope of a product life cycle which possesses certain attribute of interest such as a certification or that may be more at risk of different social issues.

The study cycle presented here is obviously iterative but also unbounded, since there will always be further hotspots to be worked on and new actions to be taken.

2 Social LCA data

Data is described as being the driving force behind a life cycle assessment (Curran 2012). However, data collection is also the most daunting, energy-intensive step of a life cycle assessment. Until recently, social LCA was suffering from a lack of tools, data, and models, making its practice particularly challenging.

In fact, several authors of articles on social LCA (Hauschild et al. 2008; Hutchins and Sutherland 2008; Ekener-Petersen and Finnveden 2013) have called for the creation of databases that would allow identifying and evaluating hotspots. As Jørgensen (2012) pointed out, for social LCA to work, data availability is central.

There are two main types of social LCA data that are necessary in order to carry out a study: modeling data and social impact data. These two types of data serve different purposes, and each deserves a separate discussion.

2.1 Modeling data

Modeling helps to ensure that the assessment planned or underway captures the entire life cycle. It also provides quantitative metrics that can assist when justifying the study boundaries and scoping choices.

Why does social LCA necessitate particular modeling data? We could think that the same product system (and modeling data) could be used for an environmental LCA and for a social LCA, and that is partly true. The social LCA literature has highlighted numerous times that location information is paramount to rigorous and relevant assessments because of the significant cultural and economic disparities that exist between countries (Hauschild et al. 2008; Benoît et al. 2010; Kloepffer 2008; Zamagni et al. 2011). However unit process (average trade) location information are a type of information only emerging in E-LCA databases and more often than not, absent.

An additional challenge also described in the literature (e.g., Zamagni et al. 2011) is the linkages of social inventory information such as the potential or verified behavior of companies to the product system. LCAA data enables to speak about results in a way that carries information about the scope of the life cycle. This presents a viable alternative to the use of the functional unit when presenting results, which enables to relay the results without losing sight of the scope and in a way that may better reach the audience. That does not mean that a functional unit is not needed to carry a social LCA. A functional unit is necessary to model the product system. However, the functional unit might not be used as a way to report about the results (depending of the study goals).

Therefore, S-LCA also requires activity variable data that will be used in the life cycle attribute assessment. The literature (Dreyer et al. 2010; Hauschild et al. 2008; Andrews et al. 2009) describes a few potential activity variables with worker hours being the most popular.

Worker hour data also offers one additional and meaningful parameter to help prioritize further action such as additional data collection. Prioritization is a key activity for *life cycle management*.

2.2 Social impact data

Social impact data are the data by which it is possible to know how a social impact category or a stakeholder group is affected in the context of a production activity. Researchers commonly make a distinction between causal-chain impacts, performance, and context.

A causal-chain impact is an impact directly attributed to the production activity itself. Social sciences do not currently provide many well-established impact pathways allowing the assigning of a particular impact to a specific and documented action tied to a unit process. The fields of public health and epidemiology are most prominent in the search for social impact pathways.

Data on social performance represents the level of realization with respect to a threshold or a best practice. This type of data and assessment (using performance reference points) is common in the field of corporate social responsibility and is frequently used in social LCA.

Contextual data represents the typical social situation in a country and an economic sector/industry. It can be used as "background data" and for scoping assessments. However, the actual supply chain performance may vary from the average, and so the contextual data may need to be replaced with site-specific data depending on the goal and scope of the study.

Different types of studies may necessitate different types of social impact data and often a mix. Parent et al. (2010) described the main difference between performance reference points and causal-chain impact assessment methods. Jørgensen (2009) showed that the type of data that would need to be collected for evaluating the impact pathways of child labor, for example, might differ from the data that would need to be collected for performance assessments. These distinctions are important to highlight. However, the most important consideration is to make sure that the planned study will provide the most relevant results for its goal and scope.

2.3 The Social Hotspots Database

The Social Hotspots Database provides a solution to enable (1) the modeling of product systems and (2) the initial assessment of potential social impacts (social hotspot or scoping assessment). It thus provides a background net that captures and represents the full supply chain and its potential impacts.

Users of the database can prioritize their efforts, collecting foreground data where it matters most, and can also motivate their choices with quantified and objective factors. They can also put in the perspective of the entire life cycle the results of their data collection efforts, for example, by expressing the percentage of worker hours at risk covered by the research.

The Social Hotspots Database system (Benoît Norris et al. 2013) is based on the Global Trade Analysis Project Version 7 (GTAP 2008) 113-region static input/output model containing data pertaining to 57 economic sectors. This input/output model is used to provide estimates of sector- and country-specific activity in product supply chains. The system also calculates worker hours for each activity in the supply chain. The labor intensity data were developed by converting GTAP data on wage payments into estimates of worker hours, skilled and unskilled, for each sector in each GTAP country/region by compiling and using wage rate data, for skilled and unskilled labor, by sector and region.

These labor hour intensity factors are used together with the social risk level characterizations, in order to express social risks and opportunities in terms of work hours, by sector and country, at a given level of risk relative to each of over 100 different indicators.

The social risk data was collected from over 200 reputable publicly available sources over a period of 4 years. The data tables are updated every 2 years with the newest information. Several criteria are used to select the data to be incorporated to the Social Hotspots Database (SHDB):

- comprehensiveness (no. of country and sectors for which data is available),
- legitimacy of the data source, reliability of method(s) used to collect data by the source,
- availability of quantitative indicators, and
- meaningfulness (the data captures well the theme investigated).

The themes incorporated to the database were selected on the basis of the subcategories identified in the UNEP-SETAC social LCA guidelines (UNEP-SETAC et al. 2009). The New Earth advisory board also informed the prioritization of themes to be incorporated as well as data availability.

For each theme and for many indicators, a characterized social issue is available. A characterized social issue is an impact subcategory or an indicator for which a level of risk (from low to very high) was determined using a characterization model. The indicators included in the SHDB and associated references as well as the characterization methods used to identify the levels of risk are transparently available. The majority of characterization models have been based on distributions of the data, where quartiles or other obvious transition points were defined as separating low, medium, high, and very high risk. For some themes, data from the literature is used to calibrate the characterization. To a lesser extent, expert judgment from New Earth's advisory board has provided insights into the characterization methods.

An impact assessment method is also made available using the Social Hotspots Index developed by New Earth. An impact assessment method allows better understanding on the vast amount of social impact information for the country-specific sectors in a supply chain. The Social Hotspot Index (SHI) takes into account many of the social issues in the SHDB. It is calculated using a weighted sum methodology. Positive impacts are not assessed with the SHI; all issues that are used are those associated with social risks which users seek to reduce and ameliorate.

2.4 Where to start

The Social Hotspots Database is analogous to other input/output models used in life cycle assessment. It provides very comprehensive top-down results, at of the cost of reduced granularity relative to process-level data.

The global IO model within the SHDB system can be used in hybrid studies where foreground processes will be augmented with worker hours per unit of output and linked to the SHDB for life cycle social risk assessment.

One new dimension is the geographical location of the input. Data on the location of the primary input(s) will need to be obtained or estimated from GTAP or trade data of the United Nation International Trade Center (2012).

3 Conclusions

One of the main challenges for social LCA has been the unavailability of modeling and social impact data. This situation is changing and will create new incentives as well as new imperatives for social LCA application. Rising globalization (World Economic Forum 2012), expectations towards companies' behaviors, and new regulations strongly incentivize businesses to seek more and better intelligence concerning their company and product social footprint.

However, the availability of this new data and modeling system does not resolve all the challenges faced by social LCA. Some of these challenges are associated with the goal and scope definition. Greater attention and discussion of the choices made (at each time they are made in the iterative process) during this crucial phase will help to guide and shape the field and moreover inform about the attributes of social LCA that are most valuable to researchers, practitioners, and their studies' stakeholders.

Finally, years of research have shown that the best way to promote improvement of social impacts in supply chains is to engage with suppliers, local communities, workers, governments, and NGOs (Barrientos 2005; Locke et al. 2009). SHDB assessments provide an initial evaluation of the hotspots associated with a product category or corporation supply chain, but it truly is just the start of a much larger process of initiating change in the social sphere that is greatly affected by production and consumption of products.

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References

Andrews E, Benoît C, Parent J, Norris G, Revéret J-P (2009) Life cycle attribute assessment, case study of Quebec greenhouse tomatoes. J Ind Ecol 13(4):565–578

Barrientos SW (2005) Impact assessment and labour: developing a learning approach. J Int Dev 17(2):259–270

Benoît C, Norris GA, Valdivia S, Ciroth A, Moberg A, Bos U, Prakash S (2010) The guidelines for social life cycle assessment of products: just in time! Int J Life Cycle Assess 15(2):156–163

Benoît Norris C, Aulisio D, Norris GA (2013) The Social Hotspot Database supporting documentation, update 2013. New Earth, York Beach

Curran MA (2012) Sourcing life cycle inventory data. In: Curran MA (ed) Life cycle assessment handbook: a guide for environmentally sustainable products. Wiley Scrivener, Hoboken, p 614

Dreyer LC, Hauschild MZ, Schierbeck J (2010) Characterisation of social impacts in LCA. Part 1: development of indicators for labour rights. Int J Life Cycle Assess 15:247–259

Ekener-Petersen E, Finnveden G (2013) Potential hotspots identified by social LCA—part 1: a case study of a laptop computer. Int J Life Cycle Assess 18(1):127–143

GTAP (Global Trade Analysis Project), Purdue University (2008) GTAP 7 database. https://www.gtap.agecon.purdue.edu/databases/default.asp. Accessed 15 July 2013

Guinée JB, Heijungs R, Huppes G, Zamagni A, Masoni P, Buonamici R, Ekvall T (2011) Life cycle assessment: past, present and future. Environ Sci Technol 45(1):90–96

Hauschild MZ, Dreyer LC, Jørgensen A (2008) Assessing social impacts in a life cycle perspective—lessons learned. CIRP Ann Manuf Technol 57:21–24

Hutchins MJ, Sutherland J (2008) An exploration of measures of social sustainability and their application to supply chain decisions. J Clean Prod 16:1688–1698

Jørgensen A (2012) Social LCA—a way ahead? Int J Life Cycle Assess 18:296–299

Jørgensen A, Lai LCH, Hauschild MZ (2009) Assessing the validity of impact pathways for child labour and well-being in social life cycle assessment. Int J Life Cycle Assess 15(1):5–16

Kloepffer W (2008) Life cycle sustainability assessment of products (with comments by Helias A. Udo De Haes). Int J Life Cycle Assess 13(2):89–95

Locke R, Amengual M, Mangla A (2009) Virtue out of necessity?: Compliance, commitment and the improvement of labor conditions in global supply chains. Polit Soc 37(3):319–351

Norris GA (2006) Social impacts in product life cycles towards life cycle attribute assessment. Int J Life Cycle Assess 1(1):97–104

Norris GA (2013) The new requirement for social leadership: healing. In: Gröschl S (ed) Uncertainty, diversity and the common good, changing norms and new leadership paradigms. Gower Publishing Limited, Farnham

Parent J, Cucuzzella C, Revéret JP (2010) Impact assessment in SLCA: sorting the sLCIA methods according to their outcomes. Int J Life Cycle Assess 15(2):164–171

UNEP-SETAC, Benoît C, Mazijn B (ed) (2009) Guidelines for social life cycle assessment of products. UNEP, Paris. http://www.unep.org/publications/search/pub_details_s.asp?ID=4102. Accessed 15 July 2013

United Nation International Trade Center (2012) Trade map. http://www.trademap.org/. Accessed 15 July 2013

World Economic Forum (2012) The shifting geography of global value chains: implications for developing countries and trade policy. http://www.voxeu.org/article/shifting-geography-global-value-chains-implications-developing-countries-and-trade-policy. Accessed 15 July 2013

Zamagni A, Amerighi O, Buttol P (2011) Strengths or bias in social LCA? Int J Life Cycle Assess 16(7):596–598